Patent Claims

1. A bidirectional transmitting and receiving device, comprising:

a transmitting component comprising an emission area of a first size, that emits light at a first wavelength;

a receiving component comprising a receiving area of a second size, that receives light at a second wavelength; and

coupling optics adapted to couple light between the transmitting component and the receiving component on one hand and an optical waveguide that is to be coupled on the other hand, wherein the coupling optics comprise a diffraction structure that focuses light at the first wavelength and at the second wavelength differently, and

wherein the transmitting component and the receiving component are arranged alongside one another or one above the other, and wherein the transmitting component is located at the focus of the diffraction structure for the emitted light at the first wavelength, and light that is emitted from the transmitting component at the first wavelength is imaged on an end surface of the optical waveguide.

2. The device as claimed in claim 1, wherein the diffraction structure comprises a diffractive lens, and wherein the transmitting component is located at the focus of the diffraction structure for the emitted light at the first wavelength, while the receiving component is located away from the focus of the diffraction structure for the received light at the second wavelength, and light which is emitted from the optical waveguide at the second wavelength is detected in an area that is widened again or is not yet focused.

3. The device as claimed in claim 2, wherein the transmitting component and the receiving component are arranged one behind the other in the beam path, with the receiving area of the receiving component being larger than the emission area of the transmitting element by a factor of at least three.

4. The device as claimed in claim 3, wherein the light that is emitted from the transmitting component at the first wavelength passes through the receiving component.

5. The device as claimed in claim 4, wherein the receiving component comprises a local transparent area in the region of the receiving area, through which the light that is emitted from the transmitting component passes.

6. The device as claimed in claim 2, wherein the receiving component is mounted directly on the transmitting component by flip-chip mounting or adhesive bonding.

7. The device as claimed in claim 1, wherein the diffraction structure comprises an optical grating in conjunction with a refractive lens or an asymmetric diffractive lens, with the emitted light and the received light being deflected at different angles.

8. The device as claimed in claim 7, wherein the transmitting component and the receiving component are arranged generally alongside one another.

9. The device as claimed in claim 7, wherein the transmitting component is located at the focus of the diffraction structure for the emitted light at the first wavelength, and the receiving component is

located at the focus of the diffraction structure for the received light at the second wavelength.

10. The device as claimed in claim 7, wherein the optical waveguide comprises an end surface that is inclined with respect to the optical waveguide axis, and the refractive or diffractive lens is arranged laterally offset with respect to the optical waveguide axis.

11. The device as claimed in claim 10, wherein the diffraction structure is arranged in the beam path such that the light that is emitted from the transmitting component passes between the transmitting component and the diffraction structure generally parallel to the optical waveguide axis.

12. The device as claimed in claim 7, wherein, in the diffraction structure that is in the form of an optical grating in conjunction with a refractive lens, the optical grating is formed or arranged on a planar face of a plano-convex lens.

13. The device as claimed in claim 7, wherein non-centric rings with a different phase relationship are provided for the diffraction structure that is in the form of an asymmetric diffractive lens.

14. The device as claimed in claim 1, further comprising a substrate having a first surface that faces an optical waveguide that is to be coupled thereto, and having a second surface that is generally parallel to the former, wherein the diffraction structure is formed or arranged on the first surface, and wherein the combination of the transmitting component and receiving component is arranged on the second surface.

15. The device as claimed in claim 14, wherein the combination of the transmitting component and the receiving component is sheathed by a potting compound.

16. The device as claimed in claim 14, wherein the first surface of the substrate is connected to a guide element for connection of an optical waveguide.